

Client Meeting 1 (6/24/14)

Summary: Meeting started off by asking the client Scott Smith various questions relating to the many aspects of the project to get a feel of what we as a team are expected to have accomplished by the end of the project. We received a general sense of what we need to do for budget items, what deliverables are desired, and various items that pertain to achieving the desired goals laid out by Scott.

Questions Asked:

1. How will we deal with budgeting? (Darvin)
 - a. We need to take every necessary item for purchase to Scott for approval. There isn't a set budget at the current time. Anything that we deem necessary to purchase can be purchased if it is within reason.
2. How will we get access to buildings? (Darvin)
 - a. Scott or one of his employees will need to accompany us unless Scott can talk facilities into giving us some sort of access to the building without giving us a master key.
3. What is Scott's schedule? (Darvin)
 - a. Scott will give us his schedule via Outlook.
4. Where are you looking for improvements? What equipment? (Darvin)
 - a. Would like to see improvements in efficiencies and more knowledge of the system that is in place. I.E. what are all the measurements currently being done and what each measurement means.
5. Will this project be used to implement real changes to the chiller, or is it merely a case study? (Patrick)
 - a. At the moment the project is just a case study to start future changes and optimization of the plant.
6. What does it cost to run the chiller? (Patrick)
 - a. We were given an estimate of last year's costs at 3 cents per ton of cooling.
7. Is there a lot of maintenance required? How much does that cost? (Patrick)
 - a. No huge maintenance has been done to get a true picture of how maintenance will affect this plant since it is a fairly new operation.
8. How is the chiller controlled/monitored? (Patrick)
 - a. The chiller is controlled using an ATS control (Alerton Technology System). Monitored from the steam plant via a workstation computer.
9. Are on-site personnel required or is it remotely operated? (Patrick)
 - a. This is a remotely monitored system, Only need to be on-site for maintenance or to check to see if the controls are working properly.
10. Are there any constraints for this project? If so, what are they? (Patrick)
 - a. Must not interfere with normal operations for summer chilling workload, Working with the HVAC People, Getting the instrumentation as soon as possible, and the short chilling season here in Moscow.

11. What standards should we be looking for when researching the control and data acquisition equipment? (Chris)
 - a. Can be rated for anything but doesn't need to be rated for explosives or anything that restrictive
12. When do we need instrumentation and data-logging equipment by? (Ali)
 - a. We need to have everything hooked up and running before at least the end of the cooling season which is in october, preferably before the end of the first few weeks of the summer senior design course.

Total Meeting Time: 1 hour

First Instructor-Team Meeting (6/24/14)

Summary: This meeting was in place to get our bearings for the project. Dr. Alexander gave us a rough outcome for what he is expecting for each semesters goal and end product. Dr. Alexander also gave a lot of pointers on managing the processes that are not in control of the team, to make sure what is being done, can be done properly.

What was Discussed:

1. The expected end goal verification: A complete math model with data verifying that the math model is depicting the correct information.
2. Budget: Make sure to run everything by Scott.
3. First Snapshot: Current state analysis, project learning, etc. Pinned up on a foam core board. Provide info so that it isn't a hassle, which it shouldn't be.
4. What needs to be completed by this coming end of summer semester: Some of a validated model complete, No need to get all the data and find out that something was missed during instrumentation install/purchasing.
5. Purchasing will all be done by Scott: Breakdown what we need for Scott so he isn't given just one option/give recommendations.
6. Access to the South Campus Chiller Plant (SCCP): This will be through Scott or through one of his employees until further notice.
7. Current State Analysis: The plant is currently functioning as a switch with 4 stages and no PLC functionality. This was a state of the art system but facilities decided that they didn't like the controls that were in place when the system was bought and went the root of having it either on or off.
8. Current Operation: Plant is very inefficient, shown that it is supposed to be outputting a maximum of 500 tons of refrigeration per chiller but only puts out about 60-80% of what is being asked.
9. Model in EES (Controller): Can be modeled in EES to be used as a controller for the entire plant.
10. Starting out with a simple model: We can simply model the system in EES to get a start early on in the modeling process and verifying with data that what is being shown is a valid model.
11. Monitor facilities to make sure that the instrumentation being installed on the plant is correctly installed. We, the team of engineers are the experts on the particular sensor, data acquisition device, etc.
12. Do thorough research on all of the devices being purchased and installed, so that we become experts on the device.
13. Proposed project timeline: Week 2 - Purchase all Instrumentation, Week 3 - Simple Math Model, Week 4 - Install Instrumentation/Program for data acquisition.

Total Meeting Time: 45 Minutes

7/1/2014 Meeting Minutes

1. Discuss what goals need to be met by next week and snapshot.
 - Patrick is going to start doing a visual model, preliminary work on the portfolio.
 - Include some items in the snapshot from the portfolio like current goals, current state analysis, etc.
 - List some specific purchased equipment on the poster board.
 - Have some sort of plant drawing to show outside people what is being modeled and verified.
 - Include various pictures of the equipment in use at the plant.
 - Show some process information.
 - Get a good start on a few simple math model.
2. Come up with code convention.
 - Darwin is going to work on getting a preliminary sheet out by the end of the week.
3. Discuss role assignments for wiki page, math models, and portfolio.
 - Pat is going to take the lead on the portfolio.
 - Ali will take the lead on the wiki page (still need to get together with John to go over wiki).
 - Darwin and Chris Will take lead on any math modeling.
4. Discuss sensors.
 - Still no word on when we will be able to get access to ATS system, JR needs to discuss more with department.
 - JR will add more protocols into the ATS system to include what we have purchased sensor and equipment wise.
5. Miscellaneous.
 - Show accurate info when displaying pictures and such in presentations and when turning in project.
 - Convey all information as simple as possible so everyone can understand the information being portrayed.

Instructor-Team Meeting Minutes 7/8/14

1. Go over the plans for the week.
 - Come up with a simple math model and visual aid to go along with that math model.
 - Ali will continue to work on the wiki page.
 - Patrick will continue to work on the portfolio and updating the 3D model of the system.
 - Darwin and Chris will work on trying to figure out a simple model for the chillers.
 - Research simple models to kick-start the project closer to the goal of a full working and validated model for the client.
 - Continue to monitor the progress of instrumentation.
 - Need to set-up a meeting with Scott to figure out all the trending data that we have and what we need to implement for the future.
2. Discuss Instrumentation progress.
 - Instrumentation is still on its way.
 - The pressure transducers have arrived at facilities.
 - Scott needs to talk to ATS to figure out a date for installation of ports for all the instrumentation that we are adding to the system.
 - The Humitrak XR is going to be shipped on the 9th, should be here within two-three days of shipment.
 - The Onicon flow sensors are going to be shipped within two weeks.
 - Concentrate on validating that all of the sensors we have purchased are useful and that we have purchased all of what is needed.
3. Miscellaneous.
 - May not need to do a fully detailed heat exchanger model using what type of heat exchanger it is to find heat transfer coefficient.
 - Start with the small model then layer off of it, make it a more complex and accurate model with what is actually going on at the plant.

7/15/2014 Meeting Minutes

1. Discuss Design Review.

- Write out the objectives for the design review, want to advance the project forward towards the goal.
- Have something valuable to present so it's not a meaningless meeting.
- Have a working model to present to the client and facilities.

2. Needs Before End of Semester.

- Get actual data trended from operations of the plant for use of code validation.
- Instrumentation installed and data points taken for trending.
- Have a working and partially validated model.

3. Instrumentation.

- ATS will come out and professionally install more ports for interfacing of new instrumentation.

7/22/2014 Meeting Minutes

1. Design Review Discussion.

- Get approval from HVAC side of facilities, give a good impression to the higher ups.
- Make sure to walk away with them thinking good of us and how we want them to do what we want them to.
- What we want from facilities is to get them to buy into what we are looking into for the system.
- Focus on trying to inform them subtly on what we are doing will work better.
- Avoid telling them outright that they are doing their job incorrectly.
- Don't assume the audience knows anything.
- Make sure to have everyone on your side when wrapping up the presentation.
- Have the meeting lead up to asking for ATS access.
- Make ATS the necessity of the entire meeting.

7/27/2014 Meeting Minutes

1.) Design Review Discussion

- Patrick will take on the role of doing the sales pitch for the Design Review.
- Chris will introduce our group and explain why we are holding this meeting.
- Ali will talk about where we are, our goals, and where we're going.
- Darwin will explain our findings in the code/math model if we have any.

2.) Goals

- Darwin and Chris will work on trying to figure out why the numbers being used from ATS/Bactalk isn't cooperating with what the math model is calculating.
- Finish up what is needed for the wiki this semester by the end of the week.
- Try to finish code and verification by snapshot #2.

9/8/2014 Meeting Minutes

1.) Goals and Discussion

- Get the alarm data parsed out.
- Get "P&ID" drawn out and labeled with states.
- Finish sifting through the data by the end of the week.
- Clarify with Scott when we are receiving new data from facilities for the month of August.
- Let Steve know when we receive our next set of data.

9/22/2014 Meeting Minutes

1.) Goals and Discussion

- Write down the method of parsing out the data and why you chose that data.
- Work on a way to present the findings of the analysis in positive manner.
- Modify the wiki site to have a good description of the project.
- Obtain predictions from the code.
- Update the wiki to conform to the requirements.
- Have a statement of design specs.
- Check with Scott on the updated P&ID.
- Identify the dependent variables.
- Look into an interactive model for our EES analysis.

10/1/2014 Meeting Minutes

1.) Compressor Information

- The compressors are two stage and magnetic bearing.
- May have an intercooler.
- Intercooler can syphon off the water from the condenser if present.

2.) Goals and Discussion

- Procedure for taking a snapshot of data.
- Splice out data in smaller more reasonable chunks.
- Take out the “mystic” chiller-data interpretation.
- Add a cost analysis.
- Have an excel calculator layout by snapshot #3.
- Include the “user’s manual” in the final report.
- What sort of PR do we need to do with UI Facilities?
- Prediction from analysis is showing cooling capacity at a given point and the cost efficiency.

10/6/2014 Meeting Minutes

1.) Goals and Discussion

- Refrigerant should be the same properties at the entrance of the compressors.
- What the error is for measured/predicted?
- Have a description of what each case of predictions is depicting.
- Look into uncertainty of measurements and compare that to the uncertainty of what is happening.
- Create an outline for modeling/experimentation.
- O&M/Crib sheet on how to export data from ATS.
- Use wiki as an outline of final report.

2.) Report Outline

- Executive summary
- Configuration of SCCP
- Initial Condition
 - o What equipment did we choose
- Math Model
- Data Analysis

10/13/2014 Meeting Minutes

1.) Discussion

- Sensors, Data, Instrumentation include into the specs section.
- Update wiki page
- Update all specs
- Update code
- Update report and timeline
- Update meeting minutes in the report and wiki page.